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STABILIZATION POND OPERATION IN TROPICAL AREAS

Annual Progress Report for Period 13 December 1967 thru 31 December 1968

February 1969

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Prepared for

US ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
Washington, DC 20315

The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

INTRODUCTION

This is the second annual progress report on stabilization pond operation in tropical areas. The first part of the report is concerned with administration and construction, while the second part of the report presents the limited amount of data collected during 1968.

ADMINISTRATION AND CONSTRUCTION

Construction of the pilot ponds was completed in May 1968. Data collection was from 31 May to 11 July 1968. During this time it was established that the hydraulic system was inadequate for the high quantities of sewage which can be treated in a primary pond located in a tropical area. Funds were received from U.S. Army Medical R & D Command for modification of the hydraulic system. USARSO Post Engineers attempted twice unsuccessfully to let contracts for modification of the hydraulic system. After the second unsuccessful bid-letting attempt, they agreed to perform necessary modifications with in-house labor. But, modification was not to start until the beginning of the "dry season". Actual modifications began 6 January 1969.

A biological aid hired in February 1968 and trained to perform laboratory tests was killed in a political riot in Panama City during May 1968. Consequently, a chemist was hired and began work in July 1968 learning the required laboratory techniques. The second technician working for the project began employment with this project in June 1968.

As the medical program of Atlantic-Pacific Interoceanic Canal Study Commission (A-PICSC) failed to receive substantial additional funds, the Medical Support and Research Division of that organization was disbanded and the responsible investigator transferred to US Army Southern Command. Consequently, two personnel spaces loaned to the project by A-PICSC stood in danger of being withdrawn. Therefore, permission was received from U.S. Army Medical Research and Development Command to submit a proposed contract for continuance of the project through the use of Gorgas Memorial Laboratory facilities and services. This contract, effective 1 July 1968, has proved to be highly effective and has removed a large part of the administrative burden.

DATA

Operation of the ponds was for such a short duration that reasonably stable conditions did not develop. However, some interesting data was obtained. Organic loading to one pond averaged approximately 500 lbs biochemical oxygen demand (B.O.D.) per acre-day. At this organic loading rate and an average influent B.O.D. of 214 mg/l, the following B.O.D. readings were obtained from a sampling point in the center of the pond.

B.O.D., Center of Pond No. 1

Depth, ft.	Average B.O.D. mg/l	B.O.D. Range, mg/l
0.0 (surface)	45	40-52
1.0	63	60-68
2.0	64	50-90
3.0	79	54-114

A large green algae population developed rapidly. At the loading rate described above, this population contributed to high dissolved oxygen surface values.

Typical cross-section values for certain parameters obtained at mid-day are shown in the table below:

Dissolved Oxygen, Temperature and pH,
Center of Pond No. 1, 26 June 68 - 1400 hours

Depth, ft.	Dissolved Oxygen, mg/l	Temperature °C	pH
0.0 (surface)	9.4	32.0	8.1
0.5	7.8	31.0	8.1
1.0	2.4	31.0	8.1
1.5	1.5	28.0	7.2
2.0	1.5	28.0	7.0
3.0	1.8	27.0	7.1
3.5	1.9	27.0	7.0
3.7 (bottom)	1.9	27.0	6.9

Dissolved oxygen surface values as high as 16 mg/l were recorded at mid-day at other times. Future work will include investigation of the influence of the large algae populations upon the organic conversion characteristics of the stabilization pond system. It is anticipated the high populations cause an extinction of light near the surface significantly extreme to severely limit aerobic processes to a narrow region near the water surface.

Trends which may be inferred from the above values will be monitored during the upcoming full scale operations of the pilot ponds.

A conservative summary of the limited amount of data collected indicates stabilization ponds in tropical areas will operate satisfactorily at organic loadings in excess of a population equivalent of 300 capita per acre-day.

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13. ABSTRACT

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